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The Florida Entomologist

Official Organ of the Florida Entomological Society

VOL. XXIII DECEMBER, 1940 No. 4

BAETINE MAYFLIES FROM FLORIDA (EPHEMEROPTERA)[1]

LEWIS BERNER

(Continued from Vol. XXIII, No. 3, page 45)

BAETIS Leach

Baetis australis Traver

Three adults of *Baetis australis* have been collected recently. This is the only Florida species of *Baetis* in my collection in which the middle abdominal segments of the male are not pale. One of these adults was reared from a nymph which bears a close resemblance to the nymph of *B. spinosus* and from the cast skin (in very poor condition), I can see no significant differences between the two immatures.

Locality records: Alachua Co., Gainesville (adult, March 23 and October 6, 1939), 6 miles N. E. Gainesville (adult, October 28, 1939).

Baetis spinosus McDunnough

This is the most widely distributed species of *Baetis* in Florida; nymphs can be found in almost any permanently lenitic situation dwelling amid vegetation, debris, pebbles, etc. McDunnough (1925) described only the male imago of *B. spinosus*. I have definitely associated both female and nymph with the male and am including here the description of these undescribed forms.

The dried males from Florida agree well with the description of this species, but alcoholics show a yellowish head marked with blackish-brown; turbinate eyes orange; mesothoracic and metathoracic wings brownish at base; tergites 7-9 with two pairs of submedian yellow spots; tergite 10 sometimes paler than 7-9.

FEMALE IMAGO (in alcohol):

Measurements: Length of body—4.5-5.7 mm.; length of wings—4.6-5.3 mm.; length of caudal filaments—6.7-7.0 mm.

Head: Mostly red-brown; large, triangular, red-brown area between lateral ocelli; region between compound eyes mostly red-brown but this red-brown area separated from eyes by yellowish-brown bars; bars continuous just behind the lateral ocelli forming a large, U-shaped figure. Yellowish area at mid-posterior margin of head; sides of head below compound eyes red-brown. Red, transverse mark on face below antennal base. Two basal antennal segments red-brown; flagellum dusky.

Thorax: Dorsum brown with limited markings. Venter yellowish-brown.

Wings: In mesothoracic wing, C, Sc, and R_1 yellow; other veins paler. Venation and angle of metathoracic wing as in male; base of wing brownish.

Legs: Yellowish-white, tarsi dusky at joinings.

Abdomen: Dorsum red-brown. On tergites 2-10, short submedian pale lines extending diagonally from anterior margin; these lines followed by pale submedian spots; lines and spots becoming smaller on successive segments. Venter red brown laterally; extending along mid-ventral region, a broad yellowish line continuous from metathorax to end of body; this line broad anteriorly becoming gradually narrower posteriorly.

Caudal filaments: White, unmarked.

NYMPH (in alcohol):

Measurements: Length of body—4.6-6.6 mm.; length of caudal filaments—2.5-3.0 mm. (fig. 10).

Head: Brown, marked with yellow; lateral margins of mandibles grayish-brown, yellowish in front; labrum tinged with gray-brown; clypeus brownish; area between antennal bases from clypeus to middle ocellus yellowish. Lateral margins of head and region below antennal base brown. Epicranial suture yellow. Median ocellus blackish-brown on dorsal margin of base, remainder white; lateral ocelli with base blackish-brown except on outer margin, remainder white. Upper portion of compound eye reddish-brown. Two basal antennal segments brown; flagellum yellowish. Second segment of labial palp greatly dilated (fig. 11).

Thorax: Pronotum mostly brownish, marked with tan. Median suture tan with tan triangle at its middle, apex pointing posteriorly. Two submedian, tan areas; lateral to these, two large tan areas. Mesonotum brown; median suture yellowish; pale brown, V-shaped marking between bases of wing pads; light brown area at base of wing pads; a pair of submedian, pale brown spots posterior to the V. Metanotum brown; yellowish-brown at anterolateral margins; wing pads yellowish. Pleura brown. Prosternum light yellowish; grayish-brown along posterior margin. Mesosternum mostly yellowish; grayish-brown anterolateral areas continuous with grayish-brown pleura; the entire marking forming a semicircle about base of leg; grayish-brown area medial to coxa, this tending to join the semicircle formed by pleural marks. Metasternum mostly yellowish; grayish-brown along posterior margin; semicircle formed with pleural markings as on mesosternum.

Legs: Coxa mostly brown; trochanter yellowish; femur yellowish with a single, brown band about one-third distance from distal end; brownish markings at distal margin; tibia yellowish, triangular yellowish-brown area in proximal, anterior portion, also distal, pale brown ring; tarsus yellowish with brownish, distal ring. Claws yellowish-brown; denticulate.

Abdomen: Tergites 1, 5, and 10 predominantly yellow brown. Brownish area on posterolateral margin of 1; tergite 5 brown near lateral margin, may have brown anterior margin; 10 brownish along anterior margin, remainder yellowish-brown; other tergites grayish-brown, yellowish-brown area on lateral margin. Yellow spot at mid-anterior margin of each tergite; running diagonally outwards from each of these spots is a pair of short pale lines; on segments 2-7, these lines may be obscured by pale submedian patches extending from anterior margin for about half the length of each of these segments; on each segment, a pair of submedian pale spots posterior to the lines. These markings inconspicuous on pale segments. Sternites almost same color as tergites; those of anterior segments mostly yellowish, particularly in median area; 10 entirely yellowish. On more deeply marked posterior sternites, two pairs of small submedian spots can be distinguished. Gills hyaline, tracheae prominent. Outer margin with slight brownish coloration, this may spread faintly over basal portion of gill (figs. 12, 13).

Caudal filaments: Short and thick. Yellowish, brown basally; deep brown band in outer third; tips of filaments brownish.

Locality records: Alachua Co., Gainesville (nymphs, March, April, May, September, October, November, 1937; nymphs, January, adults February, March, July, August, 1938; adults, February, March, April, November, 1939), Hatchet Creek (nymphs, May, 1937; adults February-May, July, November, 1938; adult, March, April, June, October, 1939), Santa Fe River at Poe Springs (nymphs, March, 1937; adults, March, 1938; adults, February, March, October, 1939; adults, March and April, 1940); Bay Co., 14.1 miles N. Panama City (nymphs, June 8, 1938), 25 miles N. Panama City (nymphs, June 8, 1938); Citrus Co., 1.5 miles south of Withlacoochee River (nymphs, March 25, 1938); Clay Co., Green Cove Springs (nymphs, October 15, 1938, F. N. Young); Columbia Co., Falling Creek (nymph, February and November, 1938; nymphs, June 30, 1939); Gadsden Co., River Junction (nymph, March 17, July 1, adult, June 30, 1939); Gilchrist Co., Suwannee River (nymphs, March 4, 1939); Hamilton Co., White Springs (nymphs, February 4, 1938), Jasper (nymphs, February 4, 1938); Hernando Co., southern county line (nymphs, March 27, 1938); Hillsborough Co., Six-Mile Creek (nymphs, November 20, 1937, L. J. Marchand; adults, March 26, 1938), Bell Creek (nymphs, March 26, 1938), Little Fish-hawk Creek (nymphs, March 26, 1938), Alafia

(nymphs, March 26, 1938) ; Holmes Co., Sandy Creek (nymphs, December 11, 1937; nymphs, June 9, 1938; adult, July 2 and nymphs December 14, 1939) ; Jackson Co., Altha (nymphs, December 10, 1937; nymphs, July 1, 1939), Florida Caverns State Park (nymphs, December 2, 1939) ; Jefferson Co., Drifton (nymphs, February 5, 1938) ; Leon Co., Tallahassee (nymphs, March 16 and 17, 1939), 15.6 miles W. Tallahassee (nymphs, June 5, 1938) ; Liberty Co., Little Sweetwater Creek (nymphs, December 10, 1937; adults, June 10, 1938), 4.5 miles N. turnoff to Torreya State Park (nymphs, June 10, 1938), Sweetwater Creek (nymphs, July 1, 1939), near Ocklocknee River (nymphs, March 16, 1939), 10 miles south of River Junction (March 17, 1939), Hosford (nymphs, March 17, 1939) ; Madison Co., 4.3 miles E. Jefferson Co. line (nymphs, February 5, 1938) ; Marion Co., Withlacoochee River (nymphs, March 25, 1938) ; Nassau Co., 19 miles N. Duval Co. line (nymphs, August 28, 1938, H. H. Hobbs) ; Okaloosa Co., Crestview (nymphs, December 12, 1937), 5 miles west of county line (nymphs, June 7, 1938), Niceville (nymphs, June 7, 1938) ; Sumter Co., 1 mile N. Sumter Co. line (nymphs, March 27, 1938), Bushnell (nymphs, March 27, 1938) ; Taylor Co., Fenholloway River (nymphs, March 18, 1939) ; Washington Co., Holmes Creek (nymphs, December 11, 1937; nymphs, June 9, 1938; nymphs, July 2, 1939) ; Walton Co., Portland (nymphs, April 3, 1938, H. H. Hobbs), Freeport (adult, April 2, 1938, H. H. Hobbs), 15 miles west of Ebro (June 7, 1938), 14 miles west of Freeport (nymphs, June 7, 1938).

These nymphs can be distinguished from other Florida species by the shape and color of the gills, by the length of the tails and intensity of the band on them, and by the dilated second segment of the labial palp.

Baetis spiethi n. sp.[2]

DIAGNOSIS: Abdominal segments 2-6 of male imago hyaline white; turbinate eyes red-brown at base; marginal veinlets in first interspace of mesothoracic wings; projection on metathoracic wing small, not curved; two longitudinal veins in hind wing; genitalia of *intercalaris* type, but without tubercle on basal segment of forceps. (Figs. 27, 29.)

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[2]I take pleasure in naming this species for Dr. Herman T. Spieth, Department of Zoology, College of the City of New York.

RELATIONSHIPS: *B. spiethi* is obviously a close relative of *B. pygmaeus* and *B. macdunnoughi*. Since the male of *B. macdunnoughi* is undescribed, conclusions as to relationships with this species must be based, for the most part, on the nymphs. In this group of species, the nymphs are characterized by lanceolate seventh gills and dilated second segment of the labial palps. The males of *B. spiethi* and *B. pygmaeus* are very similar and the few rather minor characters in which they differ show clearly that these two forms are closely related.

B. spiethi may be distinguished from *B. pygmaeus* by the fact that, in the former, there are marginal veinlets in the first interspace of the mesothoracic wing; the costal projection of the metathoracic wing is small and not curved; a tubercle on first forceps segment is absent; and the basal portion of the turbinate eyes is red-brown. In *pygmaeus*, the veinlets are absent from the first interspace; the costal projection is slightly hooked; there is a well-developed tubercle on the first forceps segment; and the basal part of the turbinate eyes is blackish.

B. spiethi is the first member of the *pygmaeus* group to be recorded from the South. This species is almost as widely distributed in Florida as *B. spinosus* and the nymphs of the two are usually coinhabitants of the smaller streams to which *spiethi* seems more or less confined.

DESCRIPTION OF HOLOTYPIC MALE IMAGO (in alcohol):

Measurements: Length of body—3.3 mm.; length of wing—3.3 mm.; length of caudal filaments—6.2 mm.

Head: Blackish-brown between posterior half of lateral ocelli and between compound eyes except for narrow, light-brown line along inner margins of eyes; this blackish-brown area triangular in shape with the apex drawn out and extending to caudal margin of head. Ocelli ringed at base with dark brown. Face brownish-gray; dark-brown semicircle around upper side of antennal suture; area between antennal base and lower portion of compound eye darker than frons. Turbinate eyes almost round, only slightly dilated distally, dorsally orange; stalk rather long, proximal third orange except for narrow red-brown band at base, remainder yellow. Antenna ringed with white at base and at distal edge of first segment; remainder of antenna blackish-brown.

Thorax: Neck membrane orange; pro- and mesonotum blackish-brown; metanotum slightly paler. Prosternum blackish-brown between bases of legs and in posterior region; intersegmental membrane orange. Mesosternum blackish-brown; metasternum dark brownish-gray. Pleura blackish-brown; a large orange-brown area with flecks of white at base of mesothoracic wings in spiracular area.

Wings: Hyaline; in mesothoracic wing, C, Sc and R brown at base, other veins colorless; short marginal veinlets present in first interspace;

some of stigmatic cross-veins anastomosed; granulations present in stigmatic area. Two longitudinal veins in metathoracic wing; costal projection small, not curved; length 0.6 mm. (fig. 29).

Legs: White; femur and tibia of fore leg very slightly dusky; tarsi and claws of all legs dusky.

Abdomen: Segments 2-6 hyaline-whitish; posterior half of sternite 6 with an irregular chalky-white pattern. Tergites 7-10 dark, reddish-brown. Sternites 7-9 white with faint brownish shadings; on 9, dark brown areas extending inwards from each side forming a pair of triangles, the base of each running the length of the lateral border, the apex reaching almost half-way to median line. Spiracles circled with black.

Genitalia: White; of *intercalaris* type but without tubercle on basal forceps segment; distal forceps segment relatively long (fig. 27).

Caudal filaments: White, unmarked.

Variation: Granulations absent from mesothoracic wings; prosternum with no orange coloration, instead, dark-brown much more extensive with light brown occupying a limited area in middle; genitalia dusky; abdomen semihyaline, white; tergite 6 red-brown along posterior border; pale mid-dorsal line on 7-10; posterior tergites paler laterally.

Dried male imago: As alcoholic. Turbinate eyes dark red, no orange discernable; abdomen yellowish-white.

DESCRIPTION OF ALLOTYPIC FEMALE IMAGO (in alcohol):

Measurements: Length of body—3.9 mm.; length of wing—3.8 mm.; length of caudal filaments—4.5 mm.

Head: Pale; most of vertex covered with an irregular brown area extending from between lateral ocelli to posterior margin of head, outer borders form a continuous, brown, longitudinal line with short, brown bars extending inward; pale spaces between bars and in mid-region of vertex; posterior border of head margined with red-brown line, interrupted at middle, and extending laterally a little beyond the longitudinal brown lines; ocelli ringed with dark brown at base; brown stripe across face between compound eye and base of antenna. Basal antennal segments red brown; flagellum brownish.

Thorax: Pronotum light brown with a pair of broad, red-brown, submedian lines. Mesonotum grayish-brown; median suture pale in anterior half, remainder dark brown; scutellum pale. Metanotum grayish-brown. Sternum light orange-brown. Pleura light brown; large red-brown spot slightly anteroventral to base of fore wing.

Wings: Right fore wing with a single marginal veinlet in first interspace, veinlet absent from left wing; stigmatic area granulate. Metathoracic wing minute; costal projection obsolescent.

Legs: As in male.

Abdomen: Dorsum brown with faint, reddish tinge; tergite 10 lighter than others; pale median line running length of abdomen, more prominent on segments 6-9; on tergites 3-8, a pair of pale submedian lines extending obliquely caudad from anterior margin almost to submedian pale spot at middle of segment. On segment 2, a pair of pale submedian spots at anterior margin and on 9, a pair of submedian spots at middle of segment; anterior border of middle tergites and anterolateral corners of each segment pale, also lateral borders pale, but this lateral pale line separated

from anterior pale area by brown markings in spiracular area. Venter yellow with orange tinge; lateral margins of sternites reddish-brown; anteriorly on each segment, this reddish-brown line extending inwards for a short distance.

Caudal filaments: Yellowish-white.

DESCRIPTION OF MALE NYMPH (in alcohol):

The nymphs are very similar to those of *B. pygmaeus* and *B. macdunnoughi* but the seventh gill of *B. spiethi* is longer and narrower than that figured for the other two species (Ide, 1937), and the apex of the sixth gill is acute, while in the others this gill is more rounded.

Measurements: Length of body—3.0-4.2 mm.; length of caudal filaments—2.2-2.8 mm. (fig. 5).

Head: Pale; developing turbinate eyes brownish-orange; a brown line on vertex along inner side of turbinate eye extending from lateral ocellus to posterior margin; brown submedian spots on posterior portion of vertex; anteriorly, these spots enlarge and extend outwards to join the longitudinal brown line; epicranial suture pale; triangular area between lateral ocelli brown; gena and outer proximal portion of mandible brown. Antennae pale. Second segment of labial palp dilated (fig. 8).

Thorax: Pronotum grayish-brown; wide, pale, median line; median suture yellowish-white; two large, pale spots near posterior border on each side of median line. Mesonotum grayish-brown; median suture yellowish-white, much dilated in anterior half; small pale triangle extends from each side of median suture near anterior margin, base of triangle on median suture; arising at middle of median line, a pair of pale lines extend obliquely forward almost as far as the apex of the submedian triangles; these lines producing a V-shaped mark in middle of mesonotum; just lateral to these lines, a pair of large, elongate pale spots fusing anteriorly with the oblique lines; near posterior portion of scutum another pair of small elongate submedian spots; lateral to these spots a pair of large irregular pale areas extending to edge of mesonotum; large pale spot at base of wing pad; scutellum light brown. Metanotum gray brown; yellowish-white under mesothoracic wing pad; median line narrow, yellowish-white. Pleura brown; on metathoracic pleura, a pale inverted U-shaped mark. Sternum pale.

Legs: Brownish-yellow; coxa shaded with brown; narrow brown band in proximal fourth; wider band in distal portion; knee dark brown; tibia with brown band beyond middle; wide brown band in proximal half of tarsus. Claws strongly pectinate.

Abdomen: Tergites 2-4 predominantly grayish-brown; 6 and 7 brown; other tergites light brown with large pale area. Tergites 1-7 with a median brown spot near anterior border. A narrow, transverse, pale area at cephalic border of 2-7; on segment 2, a small, pale, submedian area extending caudad from the transverse pale area; on tergites 2-7, a pair of pale oblique lines extending posteriorly from brown median spot, these lines progressively shorter posteriorly until they are reduced almost to spots on tergite 7; a pair of pale submedian spots at middle of segment just posterior to oblique pale lines on tergites 2-7; median, pale, triangular

The

FLORIDA ENTOMOLOGIST

Official Organ of the Florida Entomological Society
Gainesville, Florida

VOL. XXIII DECEMBER, 1940 No. 4

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Issued once every three months. Free to all members of the Society.

Subscription price to non-members is $1.00 per year in advance; 35 cents per copy.

area at posterior margin of tergites 3-5, 7-10; anterolateral corners of tergites 2-9 and posterolateral corners of segments 2-7 pale. Tergites 5, 8-10 light brown with large, pale, submedian area in anterior half; grayish-brown stripe in middle of each of these segments. Venter unmarked; pale, shaded with brown. Spines on posterior margins of tergites large and coarse. Gills hyaline, dark brown on edges, shaded with gray brown at base; apex of 6 acute; 7 lanceolate; tracheae prominent in all gills; occasionally gills 1 and 2 reddish-brown (figs. 6, 7, 9).

Caudal filaments: Outer filaments long, brownish-yellow; brown bar at middle; distal to this, a yellow band followed by brown extending to tip, but becoming paler distally; brown band in distal third of middle filament, tip brown; in basal half of outer filaments, joints ringed with brown. In some nymphs, basal portion of caudal filaments may be banded with alternate light and dark bands; brown median band may be broken by a narrow, pale band.

DESCRIPTION OF FEMALE NYMPH (in alcohol):

The female nymphs differ from the male in having pale oblique lines and spots on tergites 2-10; lines on 10 reduced to pale submedian spots on cephalic border; all tergites uniformly colored; in some specimens, pale median line on segments 8 and 9.

Holotype—male imago, in alcohol. Alachua Co., Gainesville (August 2, 1939). In collection of Museum of Comparative Zoology.

Allotype—female imago, in alcohol; reared. Columbia Co., Falling Creek (November 13, 1938). In collection of Museum of Comparative Zoology.

Paratypes—14 males, 36 females; 9 males and 20 females in collection of Museum of Comparative Zoology, others in

author's collection. Alachua Co., Hatchet Creek (5 females, April 2, 1938; 14 females, April 18, 1938; 1 female, September 14, 1938; 1 male, November 13, 1938; 1 male, March 22, 1939; 1 female, March 5, 1939; 4 males, 3 females, April 13, 1939; 5 males, May 6, 1939; 2 males, 3 females, October 11, 1939); Gainesville (5 females, August 9, 1938; 1 male, 2 females, March 18, 1940); Madison Co., Aucilla River (1 female, June 4, 1938); Walton Co., Freeport (1 female, April 2, 1938, H. H. Hobbs).

Locality records: Alachua Co., Worthington Springs (nymphs, May 12, 1937), Gainesville (nymphs, April 4 and adults November 8, 1937; nymphs, January-March, adults, August, 1938; nymphs, January, March and adults, August, 1939), Hatchet Creek (adults, February-May, September, November, 1938; adults, March-June, October, 1939), Santa Fe River (nymphs, February 5, 1939, J. M. Martin); Bay Co., 26 miles N. Panama City (nymphs, June 8, 1938); Bay Co., 26 miles N. Panama City (nymphs, June 8, 1938); Columbia Co., Falling Creek (nymphs, June 30, 1939); Hamilton Co., White Springs (nymphs, February 4, 1938), Jasper (nymphs, February 4, 1938); Hernando Co., at southern county line (nymphs, March 27, 1938); Hillsborough Co., Hurrah Creek (nymphs, December 27, 1937, L. J. Marchand; nymphs, March 26, 1938), Mullis City (nymphs, December 31, 1937, L. J. Marchand), Bell Creek (nymphs, March 26, 1938), Little Fish-hawk Creek (nymphs, March 26, 1938); Holmes Co., Sandy Creek (nymphs, December 14, 1939); Jackson Co., Altha (nymphs, June 9, 1938; adult, July 1, 1939), Florida Caverns State Park (nymphs, December 2, 1939); Jefferson Co., Drifton (nymphs, February 5, 1938), Ward (nymphs, June 5, 1938), Aucilla River at Jefferson-Madison Co. line (nymphs, June 4, 1938); Liberty Co., Sweetwater Creek (nymphs, July 1 and December 1, 1939); Marion Co., Rainbow Springs Run (nymphs, March 9, 1940); Okaloosa Co., Crestview (nymphs, December 12, 1937), 5 miles W. county line (June 7, 1938); Wakulla Co., Smith Creek (nymphs, June 5, 1938); Walton Co., Ebro (nymphs, June 7, 1938), Freeport (adult, June 7, 1938); Washington Co., Holmes Creek (nymphs, December 11, 1937; nymphs, July 2, 1939).

Baetis intercalaris McDunnough

Among the materials at hand is a series of nymphs from Northwest Florida which agree very well with Ide's description (1937) of the immatures of this species. Another series of nymphs from Central and Southwest Florida are quite similar

but differ in that the coloration of the caudal filaments is much less intense; tracheae of gills more prominent; abdomen unicolorous and the pale areas are obsolescent.

I have been able to rear several females from the nymphs occurring in Northcentral Florida; these have long intercalaries in the first interspace and well developed metathoracic wings.

Locality records: Alachua Co., Santa Fe River at Poe Springs (nymphs, May 21, 1934, J. S. Rogers; nymphs, March 24, 1937; nymphs, March 12, 1938; nymphs, February 18 and March 25, adults, October 3, 25, 1939; nymphs, March 1, 1940); Gadsden Co., River Junction (nymphs, March 17 and July 1, 1939); Hillsborough Co., Bell Creek (nymphs, March 26, 1938), Alafia (nymphs, March 26, 1938); Jackson Co., Florida Caverns State Park (nymphs, December 2, 1939); Jefferson Co., Drifton (nymphs, April 1, 1938, H. H. Hobbs); Leon Co., Tallahassee (nymphs, March 16, 1939); Liberty Co., Sweetwater Creek (nymphs, November 4, 1938; nymphs, July 1 and December 1, 1939); Walton Co., 1.2 miles E. of Okaloosa Co. line (nymphs, November 6, 1938).

PSEUDOCLOEON Klapalek

Pseudocloeon alachua n. sp.

DIAGNOSIS: Abdominal segments 2-6 of male imago hyaline white, marked with brownish-red patches; forceps long and thin, third segment as wide as distal portion of second; no intercalaries in first interspace of mesothoracic wing. (Fig. 24.)

RELATIONSHIPS: This species is close to *P. parvulum,* but the absence of the leg markings from *P. alachua* and differences in abdominal maculation easily separate the two.

DESCRIPTION OF HOLOTYPIC MALE IMAGO (in alcohol):

Measurements: Length of body—4.3 mm.; length of wings—4.0 mm.; length of caudal filaments—7.6 mm.

Head: Turbinate eyes oval shaped; orange above; upper part of stalk yellow; wide, basal ring of orange with narrow, brown band beneath this on inner side. A pair of yellow longitudinal bands lying adjacent to eyes; the yellow passing in front of eye and behind the lateral ocellus; vertex brown medially; this brown area forking, a fork going to each lateral ocellus; area between fork and middle ocellus light brown; face, between antennae, brown; ocelli reddish-brown at base. Antennae tinged with brown. Widest part of insect across turbinate eyes.

Thorax: Pronotum dark brown; pale medially and laterally. Scutum of mesonotum fuscous with pale markings; anterolateral corners yellow; pale area just cephalad of scutellum; scutellum slightly paler than scutum. Metanotum slightly paler than mesonotum; large yellow areas at antero-

lateral margins. Sternum blackish-brown but lighter than mesonotum. Pleura fuscous with yellow markings.

Wings: Hyaline; base of Sc and R brown, this brown coloring not extending to humeral brace; other veins colorless. Stigmatic area cloudy; the cloudiness extending throughout costal and subcostal spaces. In stigmatic area, right wing has six cross-veins, left wing eight veins, of which one pair is joined by a minute vein. No intercalaries in first interspace; those of second interspace small, one of them quite inconspicuous.

Legs: White, lightly shaded with black. Coxa blackish-brown: trochanter white, brown at joints; tibia of fore leg with blackish band near distal end. Tarsal claws purplish-black.

Abdomen: Tergite 1 brown along anterior margin; tergites 2-6 and posterior half of 1 hyaline white; 7-10 brown. Brownish-red lateral patches on 2, 3, 5-7; on segments 2, 6, 7 these patches are much smaller than those of segments 3 and 5; these patches tending to be somewhat elongate, those on 3 and 5 almost as long as segment; a short brownish-red line at middle of segments 4 and 6, faint on 4, more prominent on 6; a similar line at posterior margin of 7. Spiracular openings on segments 2-6 dark. Sternite 1 brown anteriorly, hyaline-white posteriorly; 2-6 hyaline white. Sternites 7-9 chalky white; 8 and 9 white in median area, brown laterally.

Genitalia: First segment of forceps brown at base, remainder white; second forceps segment constricted at middle; distal segment rounded, almost as wide as second segment. Penes cover not prominent.

Caudal filaments: White, unmarked.

DESCRIPTION OF DRIED MALE IMAGO:

Head: Eyes red brown; head fuscous; antennae brownish.

Thorax: Shiny fuscous; markings as on alcoholic specimen. Pleura anterior to hind legs paler than other parts of thorax.

Wings: As in alcoholic.

Legs: As in alcoholic except that the tarsi are quite dusky.

Abdomen: Segments 2-6 yellowish-white, markings as in alcoholic; tergites 7-10 shiny fuscous. Sternites 7-9 yellowish-white.

Caudal filaments: White.

Variations in male: Median markings on tergite 3; brown on posterior sternites limited to narrow lateral areas. In some specimens all markings absent from tergites 1-7 except lateral patches on 3 and 5.

DESCRIPTION OF ALLOTYPIC FEMALE IMAGO (in alcohol):

Measurements: Length of body—4.2 mm.; length of wings—4.3 mm.; length of caudal filaments—6.2 mm.

Head: Yellowish-white; pale line bordering medial side of eyes also pale, transverse bar between lateral ocelli. Antennae brownish; basal antennal segment bordered distally with white ring. Ocelli black at base. Head about as wide as pronotum.

Thorax: Pronotum yellowish; a brownish area forming an arc across posterior portion. Mesonotum yellowish, median line brown; a large reddish-brown triangle, the base lying on the cephalic border, the apex pointing posteriorly and quite faint, lying along the median line; just cephalad of the scutellum, a large brownish spot; scutellum pale yellow, brown along posterolateral and anterolateral margins. Metanotum yel-

lowish; small reddish-brown spots at anterolateral corners. Pleura light brown; reddish-brown patch anterior to middle and hind coxae. Prosternum yellowish-white; meso- and metasternum yellowish; metasternum brownish along anterior border.

Wings: Hyaline; all veins colorless; otherwise as in male.

Legs: Coxa and femur of fore leg brownish, remainder of leg slightly shaded with brown; other legs pale, shaded with brown; claws purplish.

Abdomen: Yellowish-white, but mass of eggs giving abdomen a green color. Lateral brownish-red patches on tergites 2, 3, 5-7. Those on 3 and 5 larger than others; median red spot on tergites 2-4, elongated into dash on tergites 6 and 7. Sternites 1-6 yellowish-white; posterior sternites white with only slight, yellowish tinge.

Caudal filaments: White.

DESCRIPTION OF NYMPH (in alcohol):

The nymphs of *P. alachua* are usually associated with *B. spinosus* and *B. spiethi* in the smaller sand-bottom creeks.

Measurements: Length of body—3.8-4.5 mm.; length of caudal filaments—3.3-3.6 mm. (fig. 1).

Head: Turbinate eyes dull orange; a pair of submedian broken lines extending almost to frontal suture, fusing here with the grayish-brown which covers face; these lines overlapping the inner margins of eyes. Median area of vertex pale; frons below median ocellus and between bases of antennae pale; clypeus pale, labrum grayish-brown. Basal antennal segments tinted with gray; flagellum pale.

Thorax: Cervical membrane with a pair of oblique, ferruginous lines extending inward from just back of middle of turbinate eyes. Pronotum gray brown; broad, oblique, submedian, brown lines extending its length and converging anteriorly; these lines broken at middle; narrow brown lines coming off laterally from submedian lines; a pair of transverse brown lines at anterior edge; yellowish spot at each corner; posterior pair surrounded by brown markings. Mesonotum grayish-brown; along mid-line, a large brown triangle about two-thirds length of mesonotum, its base near anterior margin; this triangle ferrugineous in anterior portion, sides dark brown. Just posterior to triangle, a large V-shaped brown mark, the apex of the triangle lying at the base of the V; this V darkest at its apex along mid-line where it forms a dark-brown rectangle; lateral to triangle is a large roughly triangular area. On either side of mesonotum a pair of small brown spots near anterior margin; an irregular ferrugineous area over each pair of spots; lateral to arm of V and almost contiguous to the wing pad, a brown spot; several pale spots at base of wing pad. Wing pads brownish; widest part of body across wing pads. Metanotum ferrugineous, a pair of submedian brown spots present. Pleura grayish-brown; a ferrugineous patch anterior to middle and hind legs. Sternum pale with a grayish-brown patch medial to middle and hind coxae.

Legs: Coxa yellowish; femur yellowish with large irregular grayish-brown transverse band; faint distal gray band; tibia with pale gray, distal band; tarsus yellow with faint gray band at middle; ferrugineous at joining with claw; claws denticulate. Rather long, coarse, brown hairs along posterior margins of femora.

Abdomen: Grayish-brown; tergites 3, 5, 6 with a pair of prominent brownish-red patches, those on 3 and 5 quite large; sometimes a pair of obsolescent patches present on 7. Tergites 2-7 with a pair of pale areas at posterior border; on tergites 2-7, five pale spots at anterior border; on 8 and 9, three pale spots at this border. The anterior and posterior pale spots of tergite 4 coalescing to form a pair of large, lateral, pale patches. On segments 1-10, a pair of submedian brown spots at middle of segment, obsolescent on 1 and elongate on 10; on 5-9, a brown line running from anterior border toward each brown spot. On segments 5-7, a pale spot just lateral to the brown spots, on 8 the spots at anterior border fused with these other spots forming two large pale areas. A brown longitudinal line under medial edge of gills 1-7; these lines also present on 9; tergite 10 brown at anterolateral corners; tergites 2-4, 6-9 with median brownish-red mark; elongated on 2, 6-9; tergite 8 slightly ferrugineous along posterior margin; lateral portions of segments 2-8 beneath gills mostly pale, but 4-8 with grayish anterior and posterior corners. Sternites pale; 2-8 with a pair of brown submedian spots at middle; anterior to these a pair of oblique dashes. Gills hyaline with slight, brownish tinge in basal half. Tracheation prominent (figs. 2, 3).

Caudal filaments: Pale; a very slight indication of alternate light and dark bands. Median filament longer than width of lateral at base.

Holotype—male imago, in alcohol; reared. Alachua Co., Gainesville (April 12, 1939). In collection of Museum of Comparative Zoology.

Allotype—female imago, in alcohol; reared. Alachua Co., Gainesville (April 12, 1939). In collection of Museum of Comparative Zoology.

Paratypes—25 males, 25 females; 15 males and 15 females in collection of Museum of Comparative Zoology, others in author's collection. Alachua Co., Gainesville (9 males, 3 females, March 23, 1939; 5 males, 7 females, April 12, 1939; 6 males, 5 females, April 20, 1939; 2 males, March 18, 1940), Hatchet Creek (1 female, April 1, 1939; 1 female, April 13, 1939; 1 female, May 6, 1939: 1 male, June 24, 1939; 1 male, 1 female, October 11, 1939); Marion Co., Rainbow Springs Run (1 male, 6 females, March 9, 1940).

Locality records: Alachua Co., Gainesville (nymphs, March and April, 1937; nymphs, February, 1938; nymphs, February, June, adults, March, April, 1939; adults, March, 1940), Hatchet Creek (nymphs, May, adults, April, June, October, 1939); Hernando Co., southern county line (nymphs, March 27, 1938); Hillsborough Co., Little Fish-hawk Creek (nymphs, March 26, 1938), Bell Creek (nymphs, March 26, 1938), Six-Mile Creek (nymphs, March 26, 1938), Hillsborough River (nymphs, Feb-

ruary, 1939, L. J. Marchand); Madison Co., 4.3 miles north of county line (nymphs, February 5, 1938); Marion Co., Withlacoochee River (nymphs, March 25, 1938), Rainbow Springs Run (adult, March 9, 1940); Hamilton Co., Jasper (nymphs, February, 1938).

REFERENCES

BANKS, NATHAN. 1900. New genera and species of nearctic Neuroptoid insects. Trans. Amer. Ent. Soc. 26: 245-251.

CLEMENS, W. A. 1915. Rearing experiments and ecology of Georgian Bay Ephemeridae. Supp. to 47th Ann. Rep. Canad. Dept. Marine and Fisheries. Fisheries Branch Sess. paper No. 39b, pp. 113-128, 2 pls.

EATON, A. E. 1883-87. A revisional monograph of recent Ephemeridae or mayflies. Trans. Linn. Soc. London, Sec. Ser. Zool. 3: 1-352, pls. 1-65.

IDE, F. P. 1930. Contributions to the biology of Ontario mayflies with descriptions of new species. Canad. Ent. 62: 204-213, pl. 17.

IDE, F. P. 1937. Descriptions of eastern North American species of Baetine mayflies with particular reference to the nymphal stage. Canad. Ent. 69: 219-231, 235-243, pls. 8-12.

MCDUNNOUGH, J. 1925. New Canadian Ephemeridae with notes, III. Canad. Ent. 57: 168-176, 185-192, pls. 4 and 5.

NEEDHAM, J. G., TRAVER, J. R., and HSU, Y. 1935. The Biology of Mayflies. Comstock Publishing Co., Ithaca.

TRAVER, J. R. 1932a. Mayflies of North Carolina. Jour. Elisha Mitchell Sci. Soc. 47: 85-236, pls. 5-12.

———— 1932b. *Neocloeon*, a new mayfly genus (Ephemerida). Jour. New York Ent. Soc. 40: 365-372, pl. 14.

———— 1937. Notes on the mayflies of the Southeastern states. (Ephemeroptera). Jour. Elisha Mitchell Sci. Soc. 53: 27-86, pl. 6.

MEETING OF THE FLORIDA ENTOMOLOGICAL SOCIETY

On January 5, 1916, eleven men interested in entomology, met at the University of Florida and formed the Florida Entomological Society. The annual meeting of the Society will be held on December 13 and 14, 1940, and at that time the twenty-fifth anniversary of the founding of the organization will be celebrated. An interesting program is being prepared and it is hoped that many entomologists from Florida and other states may be able to attend. The Annual Dinner will be an event of Friday evening, December 13.

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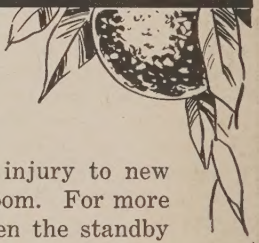

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